INCUBATORS AS ENABLERS FOR ACADEMIC ENTREPRENEURSHIP

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Abstract: The key questions that academics are struggling with are: can one teach entrepreneurship and how can it be embedded into a science, technology or engineering curriculum while maintaining high academic standards. Furthermore, prior research has pointed to a mismatch between the competencies of the highest educated and most specialised students of our academic system and the expectations of the (corporate) market (Anseel, 2012; De Grande et al., 2011). Therefore, this paper investigates the opportunities offered by 'learning-by-doing' in an ecosystem perspective.

The organization iMinds somehow acts as network integrator for research and entrepreneurship in ICT in Flanders. In this role, iMinds collaborates with universities and university colleges and other actors in the ecosystem supporting entrepreneurship.

The various mechanisms deployed to support entrepreneurship and the development of entrepreneurial skills amongst (under)graduate students are analysed. These include extra-curricular activities (workshop and coaching series). Additionally, these activities are embedded in and intertwined with the development of entrepreneurial behaviour and skills in the classical curriculum using new learning methods. Some examples can be found at Karel de Grote University College (the so-called 'The Company' minor) and at Ghent University ('student-entrepreneur' status).

The enabler to drive this evolution forward is the inclusion of incubators as part of the learning system. Students that want to start a business can spend 2 years on an MBA or join an incubator; the latter generally being accepted as a faster and more effective way of learning.

Results can be seen at three levels. Firstly, it results in an increased awareness of entrepreneurship as viable career opportunity. Secondly, these programs increase the number of student start-ups, which additionally are better equipped to grow and prosper. Since the program's start in 2011, iMinds has received eight applications for student start-ups and has supported four. Furthermore, about 25 students have made use of the (physical) incubator space. Thirdly, this ecosystem approach results in an increased cooperation between universities (e.g., at the level of doctoral schools) and with other network actors, leading to spillover effects and more effective use of proceeds.

The universities of the future will intertwine academic education with entrepreneurship. The end goal should not be that all students become entrepreneurs, but the development of entrepreneurial skills will be beneficial to all stakeholders. This requires collaboration with these stakeholders in the ecosystem, including incubators as further enablers of entrepreneurial behaviour.

Keywords: Incubators, academic entrepreneurship, student entrepreneurs, entrepreneurship education, entrepreneurship curriculum

I. INTRODUCTION

In educational organisations as well as in academic studies on the subject, debate has been on-going whether entrepreneurship can be taught (and to what extent) and how the necessary knowledge and skills can be transferred and embedded into science, technology or engineering curricula (Henry et al., 2005a; Hannon, 2006). According to certain people, like Ries (2011, p. 4-5), entrepreneurship certainly can be taught: "*Startup success can be engineered by following the right process, which means it can be learned, which means it can be taught.*" Furthermore, academics have been concerned on how to maintain the high academic standards of these educational programs (Béchard and Grégoire, 2005; Fayolle et al., 2006; Henry et al., 2005b; Hannon, 2006; Kuratko, 2005; Smith et al., 2006). Additionally, an important remark from prior literature concerns the distinction that needs to be made between entrepreneurship and management education (Gorman et al., 1997).

Besides the concerns on how to integrate entrepreneurship education in academic curricula while maintaining the quality levels, prior research has also pointed to a mismatch between the competencies of the highest educated and most specialised students of our academic systems and the expectations of the (corporate) job market (Anseel, 2012; De Grande et al., 2011). Master and doctoral students and academic researchers do not always have the most appropriate skills for (corporate) jobs or alternatively are not always perceived as having the right qualifications (De Grande et al., 2011; Nabi et al., 2006). Entrepreneurship education could help in closing this (perceived) gap, keeping in mind that the outcome of entrepreneurship education should relate to a set of skills, knowledge and experiences useful in any business setting, rather than solely the desire to start up a new venture.

Within the aforementioned setting, this paper investigates the role of incubator programs and the opportunities offered by 'learning-by-doing' experiences in an ecosystem perspective, as part of entrepreneurship education. The paper will use the case study of iMinds as organisation and network catalyst in the Flemish region in Belgium.

The structure of the paper is as follows. In the next part, iMinds as an organisation and its general activity domains will be highlighted. Afterwards, the paper will zoom in on the specific entrepreneurship programs that have been developed for students (mainly targeting Master and doctoral students) and researchers. The fourth section deals with insights into the (preliminary) outcomes of these programs. Finally, the paper is concluded with a discussion of incubators and their role in entrepreneurship education.

II. IMINDS AS NETWORK INTEGRATOR AND ITS ROLE IN ACADEMIC ENTREPRENEURSHIP

iMinds has been established in 2004 by the government of the Flemish Region (Belgium), under its original name of IBBT (Interdisciplinary Institute for Broadband Technology). The organisation, funded by the Flemish Region, was given the task to develop demand-driven for the ICT sector and foster the business and societal application and adoption of newly developed technologies, knowledge, products and services. Creating and maintaining a steady supply of new knowledge and technologies in this fast-moving industry has been recognised as crucial for a healthy ICT sector. Furthermore, supporting and organising activities to fostering innovation and entrepreneurship made up an important pillar of iMinds' activities since its inception.

iMinds as an organisation somehow acts as network integrator for research and entrepreneurship in ICT in Flanders. In this role, iMinds collaborates with universities and university colleges and other actors in the ecosystem supporting entrepreneurship. From a research side, iMinds has strategic partnerships with all five universities in Flanders (Vrije Universiteit Brussel, Ghent University, Hasselt University, KU Leuven and University of Antwerp). In this regard, iMinds is somehow a virtual organisation, in the sense that its researchers are located within these five universities and have a double affiliation (iMinds and the respective university). Through these partnerships, iMinds has direct access to and involvement with the vast majority of (ICT-related) researchers in Flanders. In this sense, iMinds acts as lynchpin in a Triple Helix ecosystem for the Flemish ICT community,

integrating various actors and stakeholders as depicted in Figure 1.

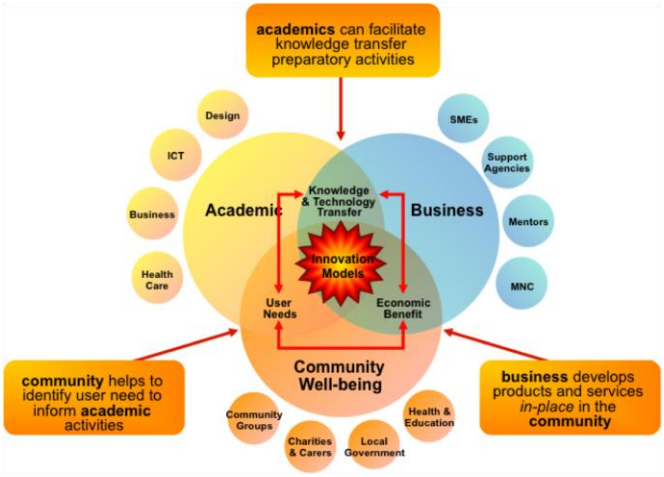

Fig. 1: *Triple Helix model*

The activities of iMinds are centred on two pillars: [1] collaborative and demand-driven research, in close cooperation with Flemish, Belgian and international companies, government organisations and other societal actors, and [2] foster entrepreneurial behaviour amongst researchers and externals and supporting commercialisation and other entrepreneurial activities with various programs.

Through the former, iMinds gets relatively easy access to primarily researchers (professors, post-doc researchers, project researchers and doctoral students). However, in second order the partnerships with the universities grant indirect access to the students, especially in more science, technology or engineering orientations (given the links with these departments through joint research activities).

The various mechanisms deployed to support entrepreneurship and the development of entrepreneurial skills amongst (under)graduate students are analysed in section 3. These include extra-curricular activities (workshop and coaching series, incubator facilities and pre-seed funding).

Additionally, these activities are embedded in and intertwined with the development of entrepreneurial behaviour and skills in the classical curriculum using new learning methods. Some examples can be found at Karel de Grote University College (the so-called 'The Company' minor; see Trommelmans et al., 2012), in the Faculties of Sciences and Medicine and Pharmaceutical, Biomedical and Veterinary Sciences at University of Antwerp (with a specific minor on entrepreneurship and management) and at Ghent University ('student-entrepreneur' status).

III. Entrepreneurship programs for (doctoral) students and researchers

Prior studies have demonstrated that knowledge is better internalised and skills adopted to a better extent if students and researchers get the opportunity to engage in learning-by-doing experiences (Hegarty and Jones, 2008; Rasmussen and Sørheim, 2006; Smith et al., 2006). This is probably even more true for entrepreneurial skills, on which debate has been on-going whether and to which extent they can be learnt through (classic) education (Henry et al., 2005a; Hannon, 2006). Prior studies have demonstrated that heterogeneity in experiences and teaching methods is critical in entrepreneurship education (Jones and Matlay, 2011; Pittaway and Cope, 2006). Furthermore, creativity should be an important part of these learning experiences (Hamidi et al., 2008). In this sense, incubators can play a major role in fostering the development of entrepreneurial skills and providing learning opportunities in a business context. Students and researchers that have the aspiration to start up a business, can either spend one or two years on an MBA or join an incubator, the latter generally being accepted as a faster and more effective way of learning (Matlay, 2006; Rasmussen and Sørheim, 2006).

Within this line of reasoning, and as part of its entrepreneurship activities, iMinds has developed a number of tools to foster the development of entrepreneurial skills amongst researchers and students and to support those willing to start up their own venture. These tools try to address all stages of the entrepreneurial process, from early skills development and opportunity recognition onwards to hands-on coaching, pre-seed funding and facilities for the effective start up of the new business.

The current toolbox that focuses on entrepreneurial skill development consists of following elements:

- *Opportunity recognition workshops* to develop basic entrepreneurial skills for researchers and help in recognising societal and business applications of their own academic or applied research
- *Student entrepreneurship workshops* to coach students on a concrete idea, support

the development of their entrepreneurial skills and highlight entrepreneurship as a viable career option

- *Intensive bootcamps* as focused coaching program to translate identified business opportunities into a first business plan, further develop entrepreneurial business sense and pay attention to team development
- *(Pre-)seed funding, expert coaching and incubator facilities* (co-working and office space), which provide opportunities to interact with and learn from other start-ups and SMEs in the iMinds' ecosystem

The tools are complemented with follow-up programs to support the start-ups that emerge from the former tools and help them and other SMEs to accelerate and internationalise.

A. Opportunity recognition workshops

iMinds organises a series of opportunity recognition workshops, in close collaboration with the doctoral schools of several (Flemish) universities (more info can be found at http://orw.iminds.be). The goal of these workshops is to help researcher tackling the first important challenge in applying their knowledge, technologies and research outcomes into societal and business applications: identifying opportunities where their research can help in solving (latent or explicit) problems or customer needs. Generally speaking, researchers are great at developing new knowledge and technologies, but somewhat less proficient at identifying challenges for potential customers and matching these with the solutions they could provide. The opportunity recognition workshops aim at supporting researchers, whether doctoral students, post-doctoral researchers or project researchers in regional, national or European-funded projects, in the development of their human capital (mainly entrepreneurial skills, but also e.g. pitching and presentation skills).

Most often, researchers are used to a technology-push approach, where in valorisation efforts they try to identify applications where they technologies could be deployed (starting from their knowledge or technologies). The opportunity recognition workshops try to increase the researchers' consciousness and skills for the opposite approach: what problems do (potential) customers encounter and how could the researchers' knowledge and technologies be used to bring solutions (and value) to these customers (market-pull approach). This opposite approach requires a new set of skills, attitudes and thinking (outside orientation). For the development and training of these skills and attitudes, hands-on practice within an incubator may be more effective than university classes. Through cooperation, both organisations can benefit: the universities' employees and students develop a new set of skills and expertise, developed in more market-oriented ecosystems such as incubators, whereas incubators and their ecosystems get a knowledge-boost through the latest technologies developed at universities.

B. Student entrepreneurship workshops

Bringing entrepreneurship education to students requires a different approach, when comparing it to programs for researchers. Students are less skilled in conducting (academic) research, but are (usually) somewhat more business-savvy and more prone to take (entrepreneurial) risks (Edwards and Muir, 2012; Lipinski et al., 2013). Therefore, a specific student entrepreneurship program has been developed, to achieve two main goals: [1] develop entrepreneurial skills amongst students, and [2] promote entrepreneurship as a viable career option, as opposed to working for an employer.

In collaboration with various universities across Flanders, a number of workshops have been put in place to help students develop their (first) business ideas and through interactive lectures and one-on-one coaching encourage them to draft their first version of a business plan. Experienced entrepreneurs coach a limited number of students or student teams on their own, concrete ideas. Topics typically include opportunity recognition, business modelling, business planning, entrepreneurial marketing and sales and the basics of financial planning, intellectual property rights and legal topics. The goal is not (necessarily) to develop full-fledged business plans, but rather to increase their appetite for entrepreneurship, further increase their enthusiasm of translating their creative ideas into business opportunities and engaging in peer learning and an entrepreneurial ecosystem.

In this regard, the cooperation between universities as educational organisations on one hand and incubators as more business-oriented organisations and ecosystems provides a win-win situation. Students get an easily accessible learning

opportunity for 'action-learning' and can further increase and broaden their skills, while both universities and incubators reinforce each other in an efficient (and effective) way.

C. Bootcamps

Even in case researchers or students have been able to recognise and identify (a number of) opportunities, they usually need additional skills to become successful entrepreneurs (or intrapreneurs). In the process towards a first business plan and the real preparation for a (new) business, team dynamics and business planning skills come to the foreground. To a certain extent, the centre of gravity moves from human capital development towards a combination of human and social capital development. iMinds uses bootcamps to support researchers, students and (future) entrepreneurs in developing more in-depth skills and expertise in these domains.

During the bootcamp, attention is devoted to three core activities. In first instance, team formation is in the centre of attention. Especially technology start-ups (such as ICT-related start-ups which iMinds supports) are often started by entrepreneurs with a rather technological background (Mosey and Wright, 2007). Furthermore, in case a start-up is prepared for or established by a team, these tend to be rather small homogenous teams (Mosey and Wright, 2007). However, given the variety of tasks at hand, heterogeneous teams have been demonstrated to increase success rates (Aspelund, Berg-Utby et al. 2005; De Cleyn, 2011; Knockaert, Ucbasaran et al. 2010). Therefore, the first part of the bootcamp (in fact the preparation for the actual bootcamp) is devoted to building complementary and heterogeneous teams.

Practice has learned that even though a heterogeneous team outperforms a homogenous one, team dynamics trump individual skills. Building an efficient and well functioning team is a delicate balance between the necessary skills as a team and the inter-personal connection between the individuals. As the bootcamp is one of the first steps in starting a company, a well functioning rather homogeneous founding team can still be complemented with additional skills in a later stage of development.

The second pillar receiving attention in the pre-bootcamp period and during the bootcamp concerns pitching and presentation skills. In order to be attractive to potential team members, customers, partners and investors, entrepreneurs need to be able to tell a compelling and consistent story about their idea or venture.

The third set of key activities concerns the transfer of more content-related entrepreneurial skills (opportunity recognition, business modelling, business planning, entrepreneurial marketing and sales and financial planning, intellectual property rights and legal topics) during an intensive bootcamp (typically a full-time week off-site in an entrepreneurial hot-spot). In this intensive period, bootcamp participants are coached on these aspects and encouraged to further develop their ideas using the input from experienced business coaches and to take advantage of the local ecosystem in which they are immersed. In this regard, collaboration with incubators provides substantial added value, given the business coaching and access to local ecosystems through the incubator. This change of environment, outside the classical academic environment, is a critical success factor for the effectiveness of the entrepreneurship 'education' through bootcamps.

D. (Pre-)seed funding and incubator facilities

The 'final piece' in entrepreneurship education would be the preparation and establishment of a real start-up. Real-life action learning probably provides the best learning opportunity to obtain and further strengthen entrepreneurial skills (Hegarty and Jones, 2008; Rasmussen and Sørheim, 2006). In this sense, engaging in an incubator program could be seen as the most effective way of doing an entrepreneurial MBA. Since (most) universities cannot offer these facilities to researchers and students, collaboration with stakeholders in the ecosystem is crucial. The end goal should not be that all researchers and students become (self-employed) entrepreneurs, but rather fostering the development of entrepreneurial skills, which is beneficial to all stakeholders involved: the researchers and students themselves in the first place, but also universities, future employers, society ….

In this sense, iMinds has two key programs to support the incubation of new start-ups and entrepreneurial initiatives: [1] a pre-seed incubation program where entrepreneurs get the opportunity to develop their business, using financial support and coaching by iMinds, and [2] an physical incubator,

where a mix of co-working spaces, offices, administrative support and a vibrant ecosystem encourages peer interaction and learning. The latter (co-working spaces and incubator facilities) is a mix of start-ups supported by and emerging out of iMinds' activities on one hand and external entrepreneurs joining these hotspots for their ecosystem character. This type of mix between 'internal' and 'external' entrepreneurs is hard to achieve in a one-sided university setting. Therefore, cooperation between universities and university colleges on one side, where education and research activities take place, and incubators on the other, bringing an entire ecosystem together, increase the likelihood of great learning opportunities for researchers and students through peer contacts and interactions with businesses.

Additionally, since ICT companies are "born global", each start-up that is supported by iMinds is stimulated to participate to the iMinds go-global program. This program offers companies easy entrance into International locations such as New York, San Francisco and Singapore. With the support of local staff and partners, companies have access to market knowledge and will find the support they need to get introduced to those local eco-systems. While the programs primary goal is to help Internationalise local companies, it offers an accelerated learning experience when operating in an International business context.

IV. RESULTS

Results of the various programs, even though some are very young, can (already) be seen at three levels.

Firstly, they result in an increased awareness of entrepreneurship as viable career opportunity. Increasingly, students and researchers are dreaming of a career as entrepreneur, following well-known role models on both a global level and increasingly on a more local level, where Belgian entrepreneurs start achieving success on an international level. Through the regular interactions with the universities, researchers and students become more and more aware of the fact that entrepreneurial skills can also be valuable outside a start-up context and increase the overall human and social capital. This has also resulted in an increased participation of researchers and students in programs and tools to foster the development of entrepreneurial skills.

Secondly, these programs increase the number of student start-ups, which additionally are better equipped to grow and prosper. Since the program's start in 2011, iMinds has received eight applications for student start-ups and has supported four, despite the program's rather low profile start (with a test case only in the city of Ghent). The first (small) successes are already being achieved, only 1.5 year after the launch of the program. The first start-ups have become profitable ventures and one start-up is close to securing in investment round of several hundred euros. Furthermore, about 35 students and researchers have made use of the (physical) incubator and co-working spaces, which embeds them to a larger extent in the entrepreneurial and business ecosystem in the region. The latter has the significant advantage of opening up new networks (social capital) and creating additional occasions to get feedback, learn and potentially increase (joint) business opportunities.

Thirdly, this ecosystem approach results in an increased cooperation between universities (e.g., at the level of doctoral schools) and with other network actors, leading to spillover effects and more effective use of proceeds. Universities get the opportunity to focus (more) on their core activities (conducting research and providing education), while at the same time having more learning opportunities in real business settings within reach. Additionally, their researchers and students can further increase (and diversify) their human and social capital, often enhancing their abilities in the job market. For the incubators, the connection with researchers and students enriches their ecosystem, creates more (knowledge-intensive) leads and strengthens the knowledge base on a network level. Increasingly, (independent) entrepreneurs find ways to team up with researchers and students, creating opportunities to strengthen their offerings towards customers and reinforcing their teams.

V. CONCLUSIONS AND RECOMMENDATIONS

The universities of the future will intertwine academic education with entrepreneurship. Currently, the number of universities and university colleges integrating entrepreneurship courses in their programs (in classic forms or using new learning methods) is increasingly. The end goal of these programs should not be that all students become entrepreneurs, but the development of entrepreneurial skills will be beneficial to all

stakeholders (researchers and students, universities, future employers …). This requires collaboration with these stakeholders in the ecosystem, including incubators as further enablers of entrepreneurial behaviour. Including incubators as part of the educational programs on entrepreneurship holds several advantages: more effective use of proceeds, spillover effects from and towards all stakeholders involved, increased interaction between academia and business, and above all increased skills and expertise for researchers and students actively participating in these programs. As a result, incubators could be seen as catalysts and enablers for effective entrepreneurship education programs in academic organisations.

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